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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Knabenbauer**	§	Group Art Unit: **2674**
	§	
Serial No.: **09/477,570**	§	Examiner: **Nguyen, Kevin M.**
	§	
Filed: **January 6, 2000**	§	Attorney Docket No.: **AUS990884US1**
	§	
For: **Three-Dimensional Display Apparatus**		

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By: Rebecca Clayton
Rebecca Clayton

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Sir:
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- Appellant's Brief (in triplicate) (37 C.F.R. 1.192); and
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Respectfully submitted,

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23/ Appeal Brief 6-29-04 NP

Docket No. AUS990884US1

PATENT

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APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on April 16, 2004.

The fees required under § 1.17(c), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. 1.192(a))

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REAL PARTIES IN INTEREST

The real party in interest in this appeal is the following party: International Business Machines, Inc.

RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interferences.

STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 2, 4-24, 26 and 28-49.

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: 1, 3, 25 and 27.
2. Claims withdrawn from consideration but not canceled: NONE.
3. Claims pending: 2, 4-24, 26 and 28-49.
4. Claims allowed: NONE.
5. Claims rejected: 2, 4-24, 26 and 28-49.

C. CLAIMS ON APPEAL

The claims on appeal are: 2, 4-24, 26 and 28-49.

STATUS OF AMENDMENTS

No amendments have been made after mailing of the Final Office Action.

SUMMARY OF INVENTION

The present invention provides a three-dimensional display apparatus that does not require tricks or illusions to represent objects in three dimensions. The display is comprised of a plurality of pixels which are, in turn, comprised of a plurality of cells. The cells include a plurality of cell walls, a cell lens wall and a cell base. The cells further include an anode and a cathode. The cell is filled with a gas that is excited by electrical discharges. A phosphorus material is applied to the anode, or nearby the anode, such that when an electrical discharge is created between the anode and the cathode, the gas is electrically excited causing the gas to emit ultraviolet radiation. A plurality of cells are combined to create a pixel. Each pixel has at least one cathode and at least one anode of each color red, green and blue. By controlling the intensities and durations of the charge to each of the anodes of the respective colors red, green and blue, every color in the visible spectrum is producible.

A plurality of the pixels are combined to create a three-dimensional display. The three-dimensional display is controlled by a control system that determines which of the pixels to turn on and which to turn off, as well as the intensities of the light that the cells of the pixels produce and the duration of their illumination. Based on this determination, the control system sends electrical signals along addressable anode bus lines, cathode lines, and the like, to cause the selected pixels to illuminate. The combination of illuminated pixels, which are three-dimensional light sources, in a three-dimensional matrix creates a three-dimensional display. The three-dimensional display is an actual three-dimensional display and is not based on optical illusions or perspective trickery.

ISSUES

The issues on appeal are as follows:

(1) whether claims 2 and 26 are obvious under 35 U.S.C. § 103(a) in view of Krembs (U.S. Patent No. 3,585,443) and MacFarlane (U.S. Patent No. 5,801,666); and

(2) whether claims 2, 4-24, 26 and 28-49 are obvious under 35 U.S.C. § 103(a) in view of Mayer (U.S. Patent No. 3,790,849) and MacFarlane (U.S. Patent No. 5,801,666).

GROUPING OF CLAIMS

The claims do not stand or fall together. Rather, the claims stand or fall in accordance with the following grouping of claims, reasons for these groupings being provided in the arguments set forth herein below:

Group I:	claims 2, 14, 19, 20, 22-24, 26, 40, 45 and 47-49;
Group II:	claims 4 and 29;
Group III:	claims 5 and 30;
Group IV:	claim 28;
Group V:	claims 6 and 31;
Group VI:	claims 7 and 32;
Group VII:	claims 8 and 33;
Group VIII:	claims 9 and 34;
Group IX:	claim 35;
Group X:	claims 10-12 and 36-38;
Group XI:	claims 13 and 39;
Group XII:	claims 15-18 and 41-44;
Group XIII:	claims 21 and 46.

ARGUMENT

I. Alleged Obviousness Based on Krembs and MacFarlane

The Final Office Action rejects claims 2 and 26 under 35 U.S.C. § 103(a) as being allegedly obvious in view of Krembs (U.S. Patent No. 3,585,443) and MacFarlane (U.S. Patent No. 5,801,666). This rejection is respectfully traversed.

With regard to claims 2 and 26, the Office Action states:

> As to claims 2 and 26, Krembs teaches as shown in Figs. 1 and 3 the three dimensional gas discharge display array is formed by a plurality of parallel two dimensional gas discharge matrices 5 (col. 2, lines 18-20). The electrode pairs formed by class enclosed wires 1 and 3 are fired through the X-Y-Z display control and power supply 17 (col. 2, lines 42-44). The firing potential of different polarities is impressed on each of the two electrodes associated with a given intersecting point in the gas display array contained in box 7. At the point where these two electrodes intersect the applied voltages add such that the potential difference between the two electrodes is greater than the firing potential. This causes a discharge at this point (col. 2, lines 47-54). That means, different polarities of each the two electrodes at that point perform an anode and a cathode.
>
> Accordingly, Krembs teaches all the claimed limitations except that pixels having a red light emitting element, a green light emitting element, and a blue light emitting element, and a phosphorus material.
>
> However, MacFarlane teaches a three-dimensional display device comprising a plurality of pixels each including red, green and blue voxels (fig. 2 and fig. 6, col. 6, liens 7-8 and col. 6, lines 23-24). Red, green, blue dye that fluoresce (abstract) perform a phosphorus material.
>
> Therefore it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify each Krembs' pixel including red, green, and blue voxels, in view of the teaching in the MacFarlane reference because this would provide a full color display device with a wide range of visible spectrum as taught by MacFarlane (col. 2, lines 52-64).

Claim 2, which is representative of claim 26 with regard to similarly recited subject matter, reads as follows:

> 2. A three dimensional display, comprising:
>
> a three dimensional matrix of light emitting elements capable of generating images in three dimensions; and
>
> a base coupled to the three dimensional matrix, the base having electrical circuitry for powering and controlling the three dimensional matrix, wherein the

> light emitting elements are pixels, and wherein each of the pixels has a red light emitting element, a green light emitting element, and a blue light emitting element, and wherein the red light emitting element, green light emitting element and blue light emitting element each include a cell having an anode, a cathode, a gas volume and a phosphorus material.

Krembs is directed to a gas filled box having parallel glass planes with embedded wires that are perpendicular to one another. The gas in the box is allowed to circulate freely through the box in order to provide a more uniform distribution of the ionized gas resulting in a more uniform firing potential for each electrode pair (column 2, lines 72-75). The box includes grids of glass enclosed wires which are used to generate a three-dimensional pattern. The wires are enclosed in glass so that they are not in contact with the gaseous element in the box and thus, deterioration of the wire is avoided (column 3, lines 3-5). Individual wires may be addressed so that a voltage is applied to two of the wires. The point where these two wires cross, the voltages add such that the potential difference between the two wires is greater than a firing potential. This causes a discharge at that point which in turn causes a point of light to be generated.

Since a single gas is provided in the box, the display of Krembs is monochromatic and cannot have a red light emitting element, a green light emitting element, and a blue light emitting element. Since the Krembs display cannot have the red, green, and blue light emitting elements, the Krembs display cannot have such elements in which each element includes a cell having an anode, a cathode, a gas volume and a phosphorus material. Thus, Krembs does not teach or suggest the light emitting elements recited in independent claims 2 and 26.

The Final Office Action alleges that Krembs teaches all of the features of claim 2 with the exception of a red light emitting element, a green light emitting element and a blue light emitting element, and a phosphorus material. Appellant respectfully submit that claim 2 specifically states that the red, green and blue light emitting elements <u>each include</u> a cell having an anode, a cathode, a gas volume and a phosphorus material. Thus, the Final Office Action's admission that Krembs does not teach a red, green, and blue light emitting elements is an admission that Krembs does not teach such light emitting elements having an anode, a cathode, a gas volume and a phosphorus material. While the energized wires in Krembs may serve the functions of an anode and a cathode, and the box of Krembs is filled with a gas, arguendo, there is no teaching or suggestion in Krembs that each pixel in a three dimensional array of pixels includes a red, green

and blue light emitting element, and that each of the red, green and blue light emitting element of each pixel has an anode, a cathode, a gas volume and a phosphorus material. To the contrary, all that is found in Krembs is a gas filled volume with an array of wires that cause discharges at crossing points to cause a point of light.

MacFarlane does not provide for the deficiencies of Krembs. MacFarlane teaches a three dimensional display device having a three dimensional array of voxels each being connected to a separate optical fiber. Light is transmitted down the optical fiber to the voxel, which is a sphere or polyhedron of a clear, synthetic resin containing a clear dye which takes on a color when energized by a beam or stream of light. In essence, the voxels are phosphorescent filters at the end of the light conductors where the light exits so that it is viewable to a viewer as a particular point of color. MacFarlane does not teach red, green and blue light emitting elements each including a cell having an anode, a cathode, a gas volume and a phosphorus material. The voxels of MacFarlane do not have an anode, a cathode or a gas volume.

The voxels of MacFarlane do not act as an anode and a cathode. There is no anode or cathode in the voxels of MacFarlane. To the contrary, the ultraviolet light channeled through the conductor, i.e. the optical fiber, energizes the dye in the voxel which causes the voxel to emit light of a particular color of the dye. There is no anode or cathode in the voxels because it is not necessary to have a discharge for energizing the dye in the synthetic resin of the voxel. Thus, while the dye in the material of the voxel may or may not be a phosphorus material, the voxels still do not contain an anode, a cathode or a gas volume.

The Final Office Action merely uses MacFarlane as allegedly teaching a three-dimensional device having a plurality of "pixels" including red, green and blue voxels and red, green and blue dye that fluoresces, i.e. a phosphorous material. Appellant respectfully submit that MacFarlane does not teach a plurality of "pixels" that each include a red, green and blue voxel. To the contrary, MacFarlane merely teaches a three dimensional array of voxels. There is no teaching regarding groups of voxels forming a pixel or that individual voxels in a pixel each include an anode, a cathode, a gas filled volume and a phosphorous material. To the contrary, the voxel is a solid piece of resin, there is no possibility of a gas filled volume in MacFarlane, let alone an anode and a cathode. This is because MacFarlane operates in a completely different and non-compatible manner to that of a discharge apparatus, such as taught in Krembs.

Thus, neither reference, whether alone or in combination, teaches or suggests that each light emitting element of a three dimensional matrix of light emitting elements includes a red light emitting element, a green light emitting element, and a blue light emitting element. Furthermore, neither reference, whether alone or in combination, teaches or suggests that each of the red, green and blue light emitting elements include a cell having an anode, a cathode, a gas volume and a phosphorus material. Therefore, even if the references were somehow combinable, which they are not, the result still would not be the invention as recited in claims 2 and 26 since these features would not be present in any alleged combination of Krembs and MacFarlane.

In addition to the above, there is no teaching or suggestion in either of MacFarlane or Krembs for the alleged combination. Again, Krembs is directed to a display device in which a gas is allowed to circulate freely and points of light are created by energizing perpendicular glass enclosed wires which, at a point of crossing, create a discharge that generates a point of light. MacFarlane is directed to a three dimensional arrangement of synthetic resin voxels having optical fibers that channel light to the voxels which are energized by the light and cause the dye in the synthetic resin to fluoresce. It is not at all clear how these two completely different display devices may be combined. The voxels of MacFarlane cannot simply be inserted into the gas filled box of Krembs without destroying the very reason for the configuration of Krembs as taught. Furthermore, there is no statement or suggestion in Krembs regarding any problem or desire that would lead one of ordinary skill in the art to look to voxel array of MacFarlane as the solution. Similarly, there is no statement or suggestion in MacFarlane regarding any problem or desire that would lead one of ordinary skill in the art to look to the gas filled box of Krembs as a solution.

The Final Office Action alleges that red, green and blue voxels may be used to replace Kremb's monochromatic three dimensional display system because it would "provide a full color display device with a wide range of visible spectrum as taught by MacFarlane." In essence, the Final Office Action is stating that it would be obvious to disregard everything taught in Krembs with the exception of a base and a three dimensional matrix and somehow implement MacFarlane with wires that operate as anodes, wires that operate as cathodes, and a gas volume (although the way in which this would be done is conspicuously missing from the Final Office Action). The alleged motivation to disregard everything in Krembs is to obtain more variety of a color image that is being displayed. One of ordinary skill in the art, being presented only with

Krembs and MacFarlane, and without a prior knowledge of Appellant's claimed invention, would not have been motivated to completely disregard the actual teachings of Krembs and replace the majority of the operational components in Krembs with voxels as taught in MacFarlane in order to obtain a color display. Similarly, one of ordinary skill in the art would not be motivated to disregard the actual teachings of MacFarlane and somehow try to implement the voxels of MacFarlane with wires that act as cathodes, wires that act as anodes and a gas filled volume. To the contrary, if the goal was to get a color three dimensional display, why not just use MacFarlane by itself as it is? MacFarlane already provides a color three dimensional display and thus, there would not be any motivation to completely gut the Krembs device and insert the MacFarlane device into the frame of Krembs. Similarly, there would be no reason to modify the manner by which the voxels operate in MacFarlane simply to achieve a multicolor three dimensional display since this is already offered by MacFarlane as it is.

Moreover, the Final Office Action does not address how a gas discharge based apparatus, such as taught by Krembs would be combined with an ultraviolet light energizing voxel based apparatus, such as taught by MacFarlane. Since these technologies operate in completely different manners that are not compatible with one another, in other words you cannot use a solid resin voxel that has embedded dye that is energized by ultraviolet light to implement a gas volume having a discharge between wires or vice versa, it would not be readily apparent to one of ordinary skill in the art how to combine them in a manner to arrive at the claimed invention. Quite the contrary, because these technologies operate in completely different manners, the suggestion would be to not combine these references because they are incompatible.

Thus, one of ordinary skill in the art would not have been motivated to combine Krembs with MacFarlane in the manner alleged by the Office Action. The alleged combination of these references provided by the Final Office Action is based on a prior knowledge of Appellant's claimed invention and is completely based on a hindsight reconstruction using Appellant's own disclosure as a guide. The only way that one of ordinary skill in the art would even attempt to combine MacFarlane with Krembs, in view of the completely different mechanism upon which they operate, is to have a prior knowledge of Appellant's claimed invention and the sole purpose of trying to recreate the claimed invention. This is clearly improper use of hindsight to reject the present claims.

Moreover, even if one of ordinary skill in the art were somehow motivated to completely remove all of the operational components of Krembs and replace them with the fiber optic lines and voxels of MacFarlane, the result still would not be the invention as recited in claims 2 and 26 for the reasons previously noted above. Similarly, even if one of ordinary skill in the art were somehow motivated to completely change the manner by which the voxels in MacFarlane operate to replace them with gas filled volumes and wires, the result still would not be the invention as recited in claims 2 and 26 as discussed above. In view of the above, Appellant respectfully submits that neither Krembs nor MacFarlane, either alone or in combination, teach or suggest the features of claims 2 and 26.

In response to these arguments, the Examiner, in the Final Office Action merely reiterates the teachings of Krembs with regard to the two-dimensional matrices of wires in a gas enclosed box and the teachings of MacFarlane with regard to the different colored voxels (see Page 8 of the Final Office Action). The Examiner then merely concludes that these features are "seen to meet the claimed limitations" (Final Office Action, page 9, line 1). This in no way addresses Appellant's reasoned arguments with regard to the lack of teachings in the references and the lack of any description in the Final Office Action as to how the teachings of Krembs and MacFarlane are allegedly being combined. This also does not address in any way, Appellant's argument with regard to the incompatibility of the two mechanisms of Krembs and MacFarlane. Basically, the Examiner's statements in the Final Office Action are not a rebuttal of Appellant's arguments at all and are merely a restatement of the rejection. Thus, the Examiner has failed to show why Appellant's arguments should not be considered persuasive.

With regard to Appellant's argument with regard to the lack of a suggestion to combine the references, the Examiner merely uses a form paragraph that references some case law as stating that the teaching, suggestion or motivation must be found in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The Examiner then reiterates the alleged "motivation" set forth in the rejection, i.e. that it would be obvious to combine the references to provide a full color display device with a wide range of visible spectrum as taught by MacFarlane. As recognized by the Examiner, and addressed above, MacFarlane already provides a full color display, so then why would it be obvious to combine MacFarlane with Krembs to obtain a full color display? The Examiner's alleged motivation does not address why one of ordinary skill in the art would be motivated to disregard the actual

teachings of MacFarlane with regard to the solid resin voxels energized by ultraviolet light provided via a fiber optic connection, and replace the three dimensional voxel structure with a gas filled volume and two dimensional arrays of wires, as taught in Krembs. Likewise, the Examiner's alleged motivation does not address why one of ordinary skill in the art would be motivated to disregard the actual teachings of Krembs and replace the gas filled box with a three dimensional array of voxels as taught by MacFarlane.

Basically, the Examiner has failed to show how the references are being combined or the reason why it would be obvious to one of ordinary skill in the art to make the particular modifications to the references that would be necessary to allegedly arrive at Appellant's claimed invention. To the contrary, the Examiner cites a purpose that is already achieved by one reference, MacFarlane – a voxel based full color display, and is completely contrary to the operation of the other reference, Krembs – a monochromatic display that, based on its described operation, cannot produce a full color display without completely disregarding the manner of operation of the Krembs mechanism.

Thus, the Examiner's alleged "Response to Arguments" does not in fact address any of the arguments presented and instead is just a reiteration of the rejection. Therefore, the Examiner has not presented any compelling reason as to why Appellant's arguments are not persuasive. Thus, Appellant respectfully request that the Board overturn the rejection of claims 2 and 26 under 35 U.S.C. § 103(a), based on the alleged combination of Krembs and MacFarlane, for the many compelling reasons set forth above.

II. Alleged Obviousness Based on Mayer and MacFarlane

The Final Office Action rejects claims 2, 4-24, 26 and 28-49 under 35 U.S.C. § 103(a) as being allegedly obvious in view of Mayer et al. (U.S. Patent No. 3,790,849) and MacFarlane (U.S. Patent No. 5,801,666). This rejection is respectfully traversed.

With regard to independent claims 2 and 26, the Office Action states:

> As to claims 2 and 26, Mayer et al teaches a three-dimensional display (col. 3, lines 26-27) comprising:
> Computer 12 operates as an interface through which information to be displayed may be input from an external source to the three dimensional monitor

system (col. 6, liens 40-43);

aluminum wire, for example, provides a suitable conductor for this purpose which may be suitably anodized (col. 2, lines 43-46). That means, at least two cross aluminum wires at grid 52 or grid 54 or grid 56 have an anode; therefore, if the grid is the anode, then the other grid has to be a cathode; a gas volume 17, and a phosphorus material (see figure 9, column 6, lines 27-52).

Accordingly, Mayer et al. teaches all the claimed limitations except the pixels having a red light emitting element, a green light emitting element, and a blue light emitting element.

However, MacFarlane teaches a three-dimensional display device comprising a plurality of pixels each including red, green and blue voxels (fig. 2 and fig. 6, col. 6, liens 7-8 and col. 6, lines 23-24).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify each Mayer et al's pixel including red, green and blue voxels, in view of the teaching in the MacFarlane reference because this would provide a full color display device with a wide range of visible spectrum as taught by MacFarlane (column 2, lines 52-64).

Mayer is directed to a capacitive memory flat panel display. This capacitive memory flat panel display depends on a capacitive memory effect, sometimes called inherent memory, to fire the cells in the device and maintain the display (column 1, lines 33-37 and 48-55). The display device is comprised of a plurality of X and Y direction running conductors that are provided with a dielectric covering and are sandwiched between panels. In this way, rather than having the wires on the outside of the panel and using the panel itself as the dielectric material, the Mayer device permits the wires to be placed inside the panel structure. This eliminates the criticality of the spacing between the panels (column 2, lines 53-68). The Mayer device operates by "writing" or energizing Y direction wires with a write signal. After the desired lines have been written, voltage from a sustain block is applied to all of the X direction lines to sustain the display (column 3, line 51 to column 4, line 8).

Mayer does teach that a plurality of these flat panels may be layered together to generate a three dimensional display device (column 6, lines 27-44). Each grid, i.e. panel within the three dimensional display device, may generate a different color either by using a different gaseous environment or using different phosphors that glow in response to a cell discharge. Mayer further teaches that the conductors may be anodized in order to provide a uniform surface that has no holes in the dielectric coating of the conductors.

Mayer does not teach a three dimensional matrix of light emitting elements wherein each element is a pixel that has a red, green and blue light emitting element and wherein each of the red, green and blue light emitting elements include a cell having an anode, a cathode, a gas volume and a phosphorus material, as recited in claims 2 and 26. Mayer actually teaches that each panel in the three dimensional embodiment may emit a different color by using different gases or different phosphors. Mayer does not teach that each pixel of a three dimensional display includes a red, green and blue light emitting element that each include a cell having an anode, a cathode, a gas volume and a phosphorus material. To the contrary, each "pixel" in the Mayer three dimensional embodiment has a single color because the panels in Mayer are monochromatic. Nowhere in Mayer is there any teaching of a pixel that has a red light emitting element, a green light emitting element and a blue light emitting element, and wherein each of the red, green and blue light emitting elements includes a cell having an anode, a cathode, a gas filled volume and a phosphorus material.

Furthermore, the Final Office Action admits that Mayer does not teach that each pixel has a red light emitting element, a green light emitting element, and a blue light emitting element, wherein the red light emitting element, green light emitting element, and blue light emitting element each include a cell having an anode, a cathode, a gas volume and a phosphorus material. The Office Action alleges, however, that MacFarlane teaches such features.

The teachings of MacFarlane have been discussed previously. While MacFarlane may teach that the voxels may be energized to emit different points of color, there is no teaching or suggestion in MacFarlane that these voxels include an anode, a cathode, and a gas volume. To the contrary, as stated above, the voxels are simply a solid bead of resin that may be doped with a dye that fluoresces when energized by ultraviolet light. They do not include an anode, a cathode or a gas volume.

Moreover, there is no teaching or suggestion in MacFarlane to include a red, green and blue voxel for each pixel of a three dimensional display of light emitting elements. To the contrary, MacFarlane merely teaches a three dimensional array of voxels. Each voxel itself would serve as a light emitting element in the three dimensional array, i.e. a pixel, and thus, each "pixel" in MacFarlane has a single color. There is no teaching or suggestion in MacFarlane to have a red, green and blue light emitting element for each pixel in a three dimensional array of pixels. Thus, MacFarlane does not teach or suggest a three dimensional matrix of light emitting

elements, wherein each light emitting element is a pixel having a red, green and a blue light emitting element, and wherein each of the red, green and blue light emitting elements include a cell having an anode, a cathode, a gas volume and a phosphorus material.

Since neither reference teaches or suggests these features, any alleged combination of these references, assuming one were somehow able to combine the teachings of these references and were motivated to do so, would still not result in the invention as recited in claims 2 and 26. That is, any alleged combination of Mayer and MacFarlane would still not result in the invention recited in claims 2 and 26 since the combination still would not include a three dimensional matrix of light emitting elements, wherein each light emitting element is a pixel having a red, green and a blue light emitting element, and wherein each of the red, green and blue light emitting elements include a cell having an anode, a cathode, a gas volume and a phosphorus material.

Furthermore, the Mayer and MacFarlane teachings are not combinable in the manner alleged by the Office Action. The Mayer reference is similar to the gas-filled box of Krembs, and is directed to a gas-filled panel having conductors place within the gas-filled panel. MacFarlane is directed to an array of voxels that are energized by ultraviolet light conducted by fiber-optic lines. The two structures are completely different and cannot be used interchangeably despite the allegations made by the Office Action. Because these two display structures operate in very different ways, it is not possible simply to replace certain elements of one reference with those of the other without destroying the functionality of one or both of the display devices described in the references. For example, one could not simply replace the "cells" in Mayer with the voxels in MacFarlane without destroying the operation of the gas-filled panels in Mayer. Similarly, one could not replace the voxels in MacFarlane with the "cells" in Mayer since it would destroy the fiber-optic/voxel based design of MacFarlane. The two devices simply are not compatible or usable with each other. While they are both generally directed to display devices, the structures and operation of these display devices render them in non-analogous art categories.

In addition to the above, one of ordinary skill in the art, being presented only with Mayer and MacFarlane, and without having a prior knowledge of Appellant's claimed invention, would not have been motivated to combine the references and modify them in the manner necessary to arrive at the claimed invention. The Office Action again alleges that the motivation to combine the references is to provide a color display while reducing or preventing cross-talk. This is

already achieved by the display of MacFarlane and the display of Mayer independently and there would be no need to combine MacFarlane with Mayer to achieve such a purpose. In actuality, because the structures and operation of the two display devices are so different from one another, one of ordinary skill in the art would not know where to begin at trying to combine MacFarlane with Mayer because they are incompatible. It is not at all clear how one could take a three dimensional array of voxels energized by ultraviolet light conducted by fiber-optic lines, combine them with gas-filled panels having grids of conductors with dielectric covers, and achieve an operational display device. Moreover, it is not at all clear how one would then modify such a combined display device to arrive at the three dimensional display device recited in claims 2 and 26.

The only motivation to even try and attempt such a combination is based completely on a hindsight reconstruction of Appellant's invention having first had benefit of Appellant's disclosure. One of ordinary skill in the art would not have taken it upon themselves to try and create a three dimensional display having a three dimensional matrix of light emitting elements, wherein each light emitting element is a pixel having a red, green, and blue light emitting element and wherein each of the red, green and blue light emitting elements include a cell having an anode, a cathode, a gas volume and a phosphorus material, based on the teachings of Mayer and MacFarlane unless they first had benefit of Appellant's disclosure and the sole purpose of trying to recreate Appellant's claimed invention from the teachings of Mayer and MacFarlane. This is clearly hindsight reconstruction using Appellant's own disclosure as a guide.

In response to these arguments, the Examiner, starting on page 9 of the Final Office Action, responds by merely reiterating teachings in the references already addressed above. The Examiner has failed to specifically address the arguments presented. In other words, the Examiner has failed to illustrate how anything in the references equates to any of the features of the claim or even explain how the Examiner is interpreting the references, how the references are allegedly being combined, or the like. To the contrary, the Examiner merely states teachings of the reference and then concludes "this is seen to meet the claimed limitations." Merely reiterating teachings in the reference that have already been addressed by Appellant's arguments does not rebut Appellant's reasoned arguments and is not explanatory as to why Appellant's arguments should not be considered persuasive.

With regard to Appellant's argument that there is no teaching or suggestion to combine Mayer with MacFarlane, the Examiner merely uses a form paragraph that references some case law as stating that the teaching, suggestion or motivation must be found in the references themselves or in the knowledge generally available to one of ordinary skill in the art. The Examiner then reiterates the alleged motivation set forth in the rejection. Appellant has shown how the alleged motivation set forth in the rejection is completely lacking and is insufficient for establishing obviousness under 35 U.S.C. § 103(a).

With regard to Appellant's argument that the Examiner is using hindsight in setting forth the alleged combination, the Examiner merely responds with a form paragraph referencing In re McLaughlin. While Appellant's realize that the Examiner must use some measure of hindsight when searching claims of an application, once those references are found, the Examiner must consider the references from a standpoint assuming no knowledge of the claimed invention. If, from such a standpoint, one of ordinary skill in the art would combine the references in the manner alleged by the Examiner, then the rejection may be proper. However, when one of ordinary skill in the art would combine the references only with a prior knowledge of the present invention and with the sole purpose of recreating the presently claimed invention, then such a combination would be based on impermissible hindsight reconstruction. Such is the case with the alleged combination of Mayer and MacFarlane and the Examiner has failed to show where this is not the case.

Thus, in view of the above, Appellant respectfully submits that neither Mayer nor MacFarlane, either alone or in combination, teach or suggest the features of independent claims 2 and 26. At least by virtue of their dependency on claims 2 and 26, neither Mayer nor MacFarlane, either alone or in combination, teach or suggest the features of dependent claims 4-24 and 28-49. Accordingly, Appellant respectfully requests withdrawal of the rejection of claims 2, 4-14, 19-24, 26, 28-40 and 45-49 under 35 U.S.C. § 103(a).

In addition to the above, neither Mayer nor MacFarlane, either alone or in combination, teaches or suggests the specific features of dependent claims 4-24 and 28-49. For example, with regard to claims 4 and 29, neither reference teaches or suggest that the red light emitting element, green light emitting element, and blue light emitting element each have an anode and a cathode. With regard to these claims, the Office Action states that Mayer teaches an intersection of anodized glass wires that would allegedly perform as an anode and a cathode and that

MacFarlane teaches red, green and blue voxels. However, nowhere in either reference is it taught that each of a red, green and blue light emitting element of a pixel in a three dimensional array of pixels have their own anode and cathode. This is because neither Mayer nor MacFarlane teach or suggest a pixel having red, green and blue light emitting elements which each have a cell having an anode and a cathode.

First, it appears that the Examiner is misinterpreting the term "anodized" as it is used with regard to the conductors in Mayer. "Anodizing" is a process by which an electrical current is used to affect the surface of a metal. The term "anodized" conductor as it is used in the Mayer reference does not refer to the conductors operating as "anodes" contrary to the Examiner's allegations in the Final Office Action. In the Mayer reference, the conductors are "anodized" such that the surface of the conductor is "a suitable dielectric" (column 2, lines 40-44). Mayer makes no mention of anodes or cathodes.

Second, even if the grids of wires in Mayer may operate as anodes and cathodes, arguendo, there is no teaching or suggestion anywhere in Mayer or MacFarlane regarding "pixels," "pixels" having red, green and blue light emitting elements, or that each of the red, green and blue light emitting elements include a cell having an anode, a cathode a gas filled volume, and a phosphorus material, let alone that each pixel has its own anode and cathode. Mayer makes mention of "cells" and states that Figure 3A is a cross section of a cell and Figure 5 is an illustration of two conductors that constitute a "cell" (see Brief Description of the Drawings in Mayer). Thus, a "cell" in Mayer is merely a crossing of conductors. There is no gas filled volume in such a cell nor is there any phosphorus material in such a cell. To the contrary, Mayer explicitly states that there cannot be any gas filled volume in such a cell because it would make the cell inoperative (column 2, lines 46-52).

If the "cells" in Mayer are equated to "cells" in the present claims, where are the "pixels" in Mayer that comprise a red, green and blue light emitting element each having a cell that includes an anode, a cathode, a gas filled volume and a phosphorus material? If the "cells" in Mayer are considered the same as "pixels" in the present claims, where is it stated in Mayer that each "cell" includes a red, green and blue light emitting element that each have an anode, a cathode, a gas filled volume, and a phosphorus material? Then, where in Mayer is there any teaching that each "cell" has its own anode and cathode? The wires in Mayer are grids of wires. Thus, the same wire may span many "cells." As a result, each "cell" does not have its own

cathode and anode, assuming for arguments sake that it is proper to refer to the wires as anodes and cathodes using the Examiner's allegations. To the contrary, it would seem that both the anode and the cathode wires would be shared with a plurality of other "cells." Thus, contrary to the allegations made in the Final Office Action, even under the Examiner' s own erroneous interpretation of the Mayer reference, the alleged combination of references still does not teach or suggest the features of claims 4 and 29.

Regarding claims 5, 6, 7, 28, 30, 31 and 32, neither Mayer nor MacFarlane, either alone or in combination, teaches or suggests that an anode of one of the pixels is shared by one or more other pixels (claims 5 and 30), a cathode of one of the pixels is shared by at least one other pixel (claim 28), a face of one pixel is shared by another pixel (claims 6 and 31), a top face of a pixel is the bottom face of a neighboring pixel, and a dies of the pixel is the side of another neighboring pixel (claims 7 and 32), and . The Office Action alleges that the grids of wires in Mayer act as anodes and cathodes and thus, the features in each of these claims is taught because of this alleged operation of the grid of wires.

With regard to claims 5, 28 and 30, while it has been stated above that the wires in Mayer are grids and thus, a wire is shared among a plurality of cells, it has not been established that Mayer teaches pixels at all, as they are defined by the present claims. Thus, even though wires in Mayer may be shared among cells, these cells are not pixels because they do not each have a red, green and blue light emitting element wherein each element has an anode, cathode, gas filled volume and phosphorus material. Thus, since Mayer does not teach pixels, Mayer cannot teach sharing of anodes or cathodes amongst pixels.

Regarding claims 6, 7, 31 and 32, again Mayer has not been shown to teach or suggest pixels and thus, cannot teach or suggest sharing of faces of a pixel as described in these claims. The Examiner fails to specifically address how Mayer teaches the sharing of faces of pixels in the manner described in these claims and merely states that because the grids of wires can allegedly act as anodes and cathodes, that this somehow means that faces of the pixels are shared. Appellant respectfully submits that the Examiner has failed to establish a prima facie case of obviousness with regard to these features and thus, the rejection of claims 6, 7, 31 and 32 should be overturned.

Regarding claims 8 and 33, neither reference teaches or suggests that the electrical connections between the pixels, signal sources and power sources are position in seams between

pixels. The Final Office Action alleges that this is taught by Mayer simply because Mayer teaches that the three dimensional panel comprises aluminum wire. Appellant respectfully submits that the Examiner has not considered all of the features in claims 8 and 33 and has not shown where either reference teaches or suggests electrical connections between pixels, signal sources and power sources being positioned in seams between pixels. There is not so much as a mention of a "seam" anywhere in either of the references. The mere teaching of "wires" in Mayer does not render obvious the specific feature of positioning such wires in seams between pixels, as recited in claims 8 and 33.

Again, the Examiner has failed to even show that either reference teaches pixels, let alone the particular positioning of electrical connections described in claims 8 and 33. The Examiner again has failed to establish a prima facie case of obviousness with regard to the features of claims 8 and 33 and the rejection of these claims should be overturned.

With regard to claims 9, 34 and 35 neither reference teaches or suggests an anode bus line or cathode line being positioned in a seam from an anode/cathode of one pixel to the anode/cathode of another pixel, respectively. The Final Office Action alleges that Mayer teaches these features because Mayer teaches the intersection of anodized glass wires. Anodized glass wires have nothing to do with an anode bus line or a cathode line being positioned in a seam from the anode/cathode of one pixel to the anode/cathode of another pixel. As mentioned above, there is not so much as a single mention of a seam anywhere in the Mayer reference. Similarly, there is no mention of an anode bus line, or a cathode line. All that is taught in Mayer is a grid of conductors. The Final Office Action has simply failed to find these features in any of the references and has failed to establish a prima facie case of obviousness with regard to claims 9, 34 and 35.

With regard to claims 10-12 and 36-38, neither reference teaches or suggests the connection between two anodes of a same colored light emitting element of two pixels in the three dimensional matrix along a seam. The Final Office Action again states that these features are taught merely because Mayer teaches anodized wires which the Examiner alleges is the same as an anode bus line and a cathode bus line. Again, this does not render obvious the specific features of having two anodes of the same colored light emitting elements of two pixels in a three dimensional matrix being by a straight line bus connection along a seam. Where is there any teaching of a seam in any of the references? Where is there any teaching of wires being

positioned within such seams in any of the references? The Examiner has failed to address this feature and merely alleges that it's taught without even pointing to any portion of either reference that teaches such a feature. The mere teaching of "wires" does not render obvious the specific positioning of bus lines recited in these claims.

The Final Office Action simply has not found this feature and has not established a prima facie case of obviousness with regard to claims 10-12 and 36-38. Nowhere has the Final Office Action shown where Mayer teaches two red, blue or green light emitting elements of two pixels having their anodes connected by a straight line bus connection along a seam. Similar arguments apply to the features of claims 13 and 39 with regard to a first cathode and a second cathode being connected by a straight line connection along a seam.

With regard to claims 15-18 and 41-44, neither reference teaches or suggests the spacing between anodes/cathodes specifically recited in each of these claims. The Final Office Action alleges that MacFarlane teaches a cubic voxel array having allegedly "equal twelve sides." Somehow, the Examiner apparently thinks that because a cubic voxel array is taught, that the specific spacing of anodes and cathodes described in these claims. Just because the voxel array of MacFarlane may be cubic does not mean that any anodes or cathodes are spaced in the manner recited in these claims. MacFarlane does not even teach anodes or cathodes because MacFarlane energizes the voxels using ultraviolet light, not a discharge between an anode and a cathode. Therefore, MacFarlane cannot possible teach or suggest that the distance between an first anode and a second anode of a first red/green/blue light emitting element or pixel and a second red/green/blue light emitting element or pixel is twice the length of one side of a pixel. The mere teaching of a plurality of voxels in a cubic voxel array does not teach or suggest these features.

Regarding claims 21 and 46, neither reference teaches or suggests that the input image is coded in a three dimensional coordinate system. The Office Action alleges that these features are taught by MacFarlane in that MacFarlane teaches a computer that operates as an interface through which information to be displayed may be input from an external source. The features of a control system receiving input images coded in a three dimensional coordinate system, as recited in claims 21 and 46 is not obviated simply because there is an external source of an image in MacFarlane. Nowhere in MacFarlane or Mayer is it taught that the input is coded in a three dimensional coordinate system and the Office Action has failed to point to any specific teaching to this effect in any of the references. The Final Office Action fails to even address this specific

feature but instead merely states that the reference teaches an external source. This in no way teaches or suggests that the "external source" must provide an image coded in a three dimensional coordinate system. Once again, the Examiner has simply failed to establish a prima facie case of obviousness with regard to the features recited in claims 21 and 46.

The Examiner's response to Appellant's arguments with regard to each of these dependent claims is to simply reiterate the rejection. Thus, the Examiner has not rebutted any of Appellant's arguments for similar reasons as previously stated when addressing the Examiner's remarks in the Final Office Action.

Thus, in addition to being dependent on independent claims 2 and 26, dependent claims 4-24 and 28-49 are also allowable over the alleged combination of Mayer and MacFarlane based on the specific features recited in these claims.

CONCLUSION

For the reasons stated above, Appellant respectfully submits that the rejections under 35 U.S.C. § 103(a) of claims 2, 4-24, 26 and 28-49 has been overcome. Accordingly, Appellant respectfully requests that the Board of Patent Appeals and Interferences overturn the rejections set forth in the Final Office Action.

Respectfully submitted,

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APPENDIX OF CLAIMS

The text of the claims involved in the appeal are:

2. A three dimensional display, comprising:

a three dimensional matrix of light emitting elements capable of generating images in three dimensions; and

a base coupled to the three dimensional matrix, the base having electrical circuitry for powering and controlling the three dimensional matrix, wherein the light emitting elements are pixels, and wherein each of the pixels has a red light emitting element, a green light emitting element, and a blue light emitting element, and wherein the red light emitting element, green light emitting element and blue light emitting element each include a cell having an anode, a cathode, a gas volume and a phosphorus material.

4. The three dimensional display of claim 2, wherein the red light emitting element, green light emitting element, and blue light emitting element each have an anode and a cathode.

5. The three dimensional display of claim 2, wherein an anode of one of the pixels is shared by at least one other pixel.

6. The three dimensional display of claim 2, wherein a face of one of the pixels is shared by another pixel.

7. The three dimensional display of claim 2, wherein a top face of a pixel is the bottom face of a neighboring pixel, and wherein the side of the pixel is the side of another neighboring pixel.

8. The three dimensional display of claim 2, wherein electrical connections between the pixels, signal sources and power sources are positioned in seams between pixels.

9. The three dimensional display of claim 2, wherein an anode bus line is positioned in a seam from a first anode of a pixel to a second anode of another pixel.

10. The three dimensional display of claim 2, wherein a first anode of a first red light emitting element of a pixel is connected to a second anode of a second red light emitting element in another pixel by a straight line bus connection along a seam in any direction in the three dimensional matrix.

11. The three dimensional display of claim 2, wherein a first anode of a first green light emitting element of a pixel is connected to a second anode of a second green light emitting element in another pixel by a straight line bus connection along a seam in any direction in the three dimensional matrix.

12. The three dimensional display of claim 2, wherein a first anode of a first blue light emitting element of a pixel is connected to a second anode of a second blue light emitting element in another pixel by a straight line bus connection along a seam in any direction in the three dimensional matrix.

13. The three dimensional display of claim 2, wherein a first cathode of a first pixel is connected to a second cathode of a second pixel by a straight line connection along a seam in any direction in the three dimensional matrix.

14. The three dimensional display of claim 2, wherein the distance between two adjacent anodes is a square root of two multiplied by a length of one side of a pixel.

15. The three dimensional display of claim 10, wherein a distance between the first anode and the second anode of the first red light emitting element and the second red light emitting element is twice the length of one side of a pixel.

16. The three dimensional display of claim 13, wherein a distance between the first cathode and the second cathode of first pixel and the second pixel is twice the length of one side of a pixel.

17. The three dimensional display of claim 11, wherein the distance between the first anode and the second anode of the first green light emitting element and the second green light emitting element is twice the length of one side of a pixel.

18. The three dimensional display of claim 12, wherein the distance between the first anode and the second anode of the first blue light emitting element and the second blue light emitting element is twice the length of one side of a pixel.

19. The three dimensional display of claim 2, further comprising a control system that controls which of the light emitting elements in the three dimensional matrix are illuminated.

20. The three dimensional display of claim 19, wherein the control system controls color, intensity and duration of the light emitted by the light emitting elements in the three dimensional matrix.

21. The three dimensional display of claim 19, wherein the control system receives an input image coded in a three dimensional coordinate system.

22. The three dimensional display of claim 21, wherein the input image is received from one of a computer, television signal receiver, cable system receiver, satellite receiver, and a storage medium.

23. The three dimensional display of claim 21, wherein the control system pixelizes the input image for reproduction by the three dimensional display.

24. The three dimensional display of claim 2, wherein the three dimensional matrix has a cube shape.

26. A three dimensional display, comprising:

a plurality of three dimensional light emitting elements configured into a three dimensional matrix of light emitting elements that emits light in three dimensions; and

a controller that controls the operation of the light emitting elements to generate a three dimensional image, wherein the light emitting elements are pixels, and wherein each of the pixels has a red light emitting element, a green light emitting element, and a blue light emitting element, and wherein the red light emitting element, green light emitting element and blue light emitting element each include a cell having an anode, a cathode, a gas volume and a phosphorus material.

28. The three dimensional display of claim 26, wherein a cathode of one of the pixels is shared by one or more other pixels.

29. The three dimensional display of claim 26, wherein the red light emitting element, green light emitting element, and blue light emitting element each have an anode and a cathode.

30. The three dimensional display of claim 26, wherein an anode of one of the pixels is shared by one or more other pixels.

31. The three dimensional display of claim 26, wherein a face of one of the pixels is shared by another pixel.

32. The three dimensional display of claim 26, wherein a top face of a pixel is the bottom face of a neighboring pixel, and wherein the side of a pixel is the side of another neighboring pixel.

33. The three dimensional display of claim 26, wherein electrical connections between the pixels, signal sources and power sources are positioned in seams between pixels.

34. The three dimensional display of claim 26, wherein an anode bus line is positioned in a seam from an anode of a pixel to an anode of another pixel.

35. The three dimensional display of claim 26, wherein a cathode line is positioned in a seam from a cathode of one pixel to a cathode of another pixel.

36. The three dimensional display of claim 26, wherein an anode of a red light emitting element of a pixel is connected to another anode of a red light emitting element in another pixel by a straight line bus connection along a seam in any direction.

37. The three dimensional display of claim 26, wherein an anode of a green light emitting element of a pixel is connected to another anode of a green light emitting element in another pixel by a straight line bus connection along a seam in any direction.

38. The three dimensional display of claim 26, wherein an anode of a blue light emitting element of a pixel is connected to another anode of a blue light emitting element in another pixel by a straight line bus connection along a seam in any direction.

39. The three dimensional display of claim 26, wherein a first cathode of a first pixel is connected to a second cathode of a second pixel by a straight line connection along a seam in any

direction.

40. The three dimensional display of claim 26, wherein the distance between two adjacent anodes is the square root of two times the length of one side of a pixel.

41. The three dimensional display of claim 36, wherein the distance between the anodes of the red light emitting elements is twice the length of one side of a pixel.

42. The three dimensional display of claim 37, wherein the distance between the anodes of the green light emitting elements is twice the length of one side of a pixel.

43. The three dimensional display of claim 38, wherein the distance between the anodes of the blue light emitting elements is twice the length of one side of a pixel.

44. The three dimensional display of claim 39, wherein the distance between the first cathode and the second cathode is twice the length of one side of a pixel.

45. The three dimensional display of claim 26, wherein the controller controls the color, intensity and duration of the light emitted by the light emitting elements.

46. The three dimensional display of claim 26, wherein the controller receives an input image that is coded in a three dimensional coordinate system.

47. The three dimensional display of claim 46, wherein the input image is received from one of a computer, television signal receiver, cable system receiver, satellite receiver, and a storage medium.

48. The three dimensional display of claim 46, wherein the control system pixelizes the input image for reproduction by the three dimensional display.

49. The three dimensional display of claim 26, wherein the light emitting elements are formed into a matrix having a cube shape.